ICI magazine

August 1969

in this issue

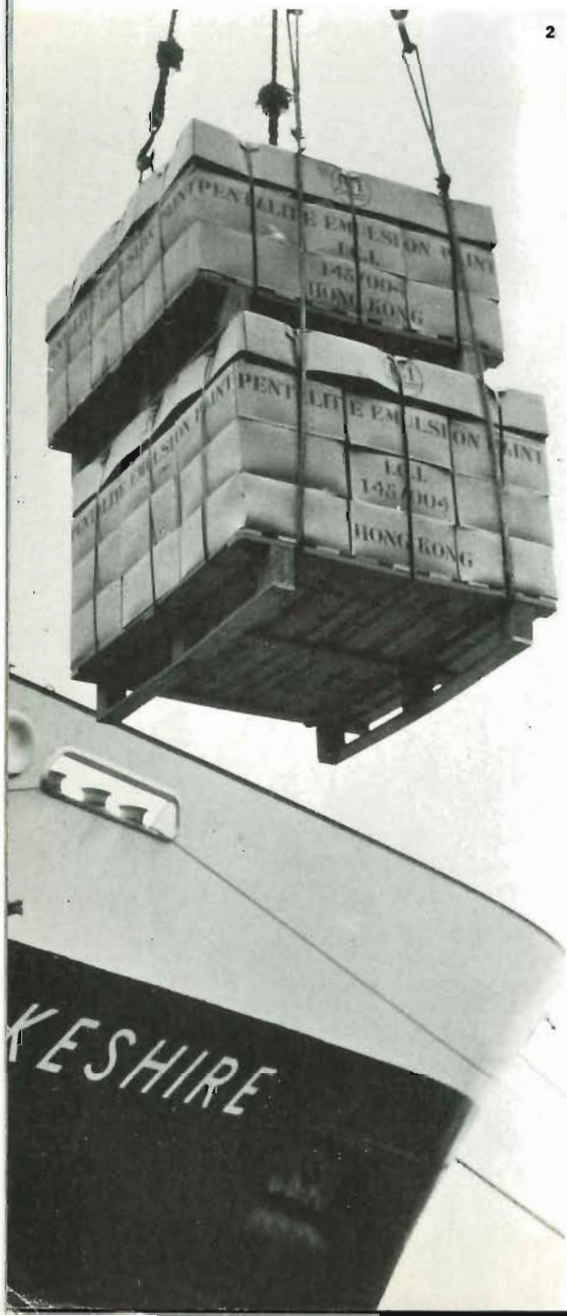
1 Just five nervous first-timers – and one sadistic Army parachute jump instructor.... To know how it feels, see page 190.

2 ICI paint on its way to Hong Kong. Value of Britain's exports last year was over £5700m, tonnage exported over 143 million. How does it all get there? For an ICI export man's angle, read 'Exporting can be fun', page 184.

3 Come on in! It's not cold! For tips on photographing a girl in her swimsuit, see page 177.

4 These four members of Head Office and the UK Sales Organisation were among 112 representatives of ICI staff in Britain who met on July 8 at the Europa Hotel, London, for the sixth Central Staff Conference. The Staff Development Programme, pensions, fringe benefits and a suggested change in the retirement age for women were all on the agenda. Page 172.

5 John Glasby (seen here at work with a microscope equipped for photomicroscopy) also studies variable stars – from his own backyard. Page 174.



ICI magazine

Volume 47 Number 353

Front cover: A worm's last eye view. This picture, an impression of sheep and cattle worms' last look at life, is being used by ICIANZ in Australia to advertise 'Nilverm' sheep and cattle drench. Taken with a fish-eye lens, it gives a 360 degree view of a grazier poised with drenching gun in hand. To get the shot the photographer lay on his back in a sheep race.

Back cover: As the sun goes down a parachutist on an evening drop comes down towards the earth. Our article, on page 190, by an ICI man who parachutes with the Army in his spare time, vividly conveys his mingled feelings before, during and after his first descent.

Photograph: Dave Waterman

ICI Magazine for employees at home and abroad appears every month, price 2d. Members of the Company are invited to submit articles, photographs and suggestions for articles. Material offered should reflect the author's own experience, interests or ideas. Payment is made for articles or illustrations accepted. The Company does not necessarily endorse the views of contributors.

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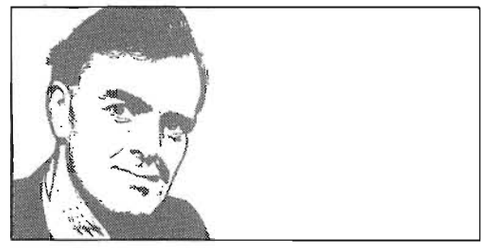
people in print

John Glasby, *author of 'Backyard astronomer' (page 174), joined the Research Department of Nobel Division in 1952 after graduating in chemistry at Nottingham University. He has carried out research on detonators, safety fuses and rocket propellants and is at present in charge of the spectroscopy group, Physical Chemistry Section.*
Outside work, his principal interests are astronomy and writing fiction. He is a Fellow of the Royal Astronomical Society and of the British Interplanetary Society, and since 1964 has been Director of the Variable Star Section of the British Astronomical Association.
He has written two books on astronomy, together with over four hundred novels and short stories on various themes.

Margaret Reekie, *as press officer of ICI Fibres Ltd, is responsible for all commercial press and public relations activities.*
She joined British Nylon Spinners as their press officer in November 1946, a month before the first British-made nylon stockings were sold in the UK, and came to ICI when BNS merged with Fibres Division in 1965.
An Oxford graduate, she began her career as a journalist and during the last war worked for the Ministry of Information and the Board of Trade 'on everything from clothing coupons to development areas.' On page 177 she offers some tips for holiday photography.

David Jones, *above left, editor of the book from which 'Counting the cost – in chemicals' was adapted (page 178), is a deputy chairman of Heavy Organic Chemicals Division.*
A graduate of Imperial College, London, he joined ICI in 1940 as a research chemist at Billingham. He became a section manager in 1947 and was transferred to Development Department in 1953, and to Oil Works in 1957. On the formation of HOC Division in 1958 he was made research manager, becoming Research and Development director in 1964 and deputy chairman in 1967. Dr Jones' hobbies are reading and gardening.

Ralph Quartano, *(next to David Jones), author of 'Counting the cost – in chemicals' (page 178), took a degree in chemical engineering at Cambridge and worked with Shell in Holland, and Lummus in the UK as a design engineer on oil and chemical plant before transferring to journalism. He joined Temple Press in 1959 as editor of 'Petroleum Times' and became founder editor of 'European Chemical News' in 1962.*
He was appointed editorial director of Heywood Temple Industrial Publications, a subsidiary, and 18 months later became managing director. This year, Mr Quartano became managing director of a larger group of 23 journals, IPC's Engineering, Chemical and Marine Press Ltd.



Cyril Cowley, *author of 'Exporting can be fun' (page 184), is a commercial assistant with HOC Division, currently handling export freight accounts and price quotations. He joined ICI in 1960 after 12 years with the National Coal Board as a marketing officer. In HOC Division he worked in the Sales Control Department, where he was responsible for all export pricing, and in the Forecasts and Administration Section before joining the Distribution Department in 1967.*
He is a member of the National Association of Round Tables and a keen golfer.
Other interests include travel and motoring, theatrical production – during National Service he produced variety and revue, and toured remoter service units in the UK – and collecting maps.

Ben Hawkins, *whose light-hearted account of his first parachute jump appears on page 190, is ammonia soda area section maintenance manager at Mond Division's Winnington Works. At 18, he joined the Royal Navy for six years and after training at the Royal Naval College, Dartmouth, and various engineering courses, he went to sea, mostly in the Far East and South Atlantic. He came to Mond Division seven years ago and at about the same time joined the Parachute Regiment (T.A.). After four years in the Engineering and Technical Departments, he was appointed assistant power plant manager at Winnington Works in 1965 and took over his present post on the ammonia soda plant in 1966. He is married with two children and his wife is a dress designer.*

1969 central staff

Mr R. S. Wright, ICI Personnel Director, introduced a discussion on the Staff Development Programme

Mrs J. A. Kilshaw (Pharmaceuticals) proposing that the Company should consider allowing women staff the option of working until the age of 62, instead of retiring at 60

Mr A. Hope (Plastics) was another representative who spoke of the Staff Development Programme

Mr I. M. Waldram (Agricultural) was one of the speakers in the discussion on the staff Development Programme

Since the first Central Staff Conference was held, experimentally, five years ago, this annual gathering of staff representatives from Divisions, ICI Fibres, Head Office and the UK Sales Organisation has become firmly fixed in the joint consultation calendar. It is an occasion when staff of different levels may speak candidly to the Chairman, Directors and senior managers about the things which concern them most as employees of ICI. And when they hear equally forthright statements, comments and answers in return. This year's conference, on July 8 at the Europa Hotel, London, was no exception.

From the 112 Divisional and other representatives there was keen comment, interesting questions, occasional disagreement and clear exposition of staff opinion as expressed through the staff committee system.

They spoke on subjects as unrelated as the new Staff Development Programme, the capital appreciation of pension funds and the possibility – no more than that – of women staff being allowed to stay at work until 62, instead of 60. A question-and-answer session follows the Chairman's opening address and this year Sir Peter Allen, Chairman of ICI, was asked a wide range of off-the-cuff questions. Should the Company bother about its good name, or just get on with making and selling products and let its good name take care of itself? Where was overseas development likely to be highest? When would the 'new' UK raw materials, natural gas and potash, make a contribution to profits? These were some of the queries put by staff and answered by the Chairman and his colleagues.

In his opening speech, the Chairman commented on how he had found the Company during more than 50 visits in the past year to plants and other centres in Britain and overseas: 'What I have seen is most encouraging. At home and all over the world I found ICI alert and keen to get on with the job, well-equipped both technically and commercially, full of ideas and looking for opportunities for expansion.'

After commenting that a good indication of achievement in recent years had been in gaining Queen's Awards to Industry – this year the Award was won by three Divisions and by Bexford Ltd, an ICI subsidiary – the Chairman referred to last year's Group results and to the Company's changing pattern of business; commercially, closer to the customer; geographically, increasingly into overseas markets. This year, sales and before-tax profits were up in the first quarter, the high level of investment in Europe was now paying off and all staff, at home and abroad, had helped to make this improvement possible. For this last reason, the Board had been very concerned by the outcome of the Government's consideration of the proposed salary increases last January.

This brought the Chairman to one of the most important topics of the day, one which was later discussed at length – the Staff Development Programme. It was, he said, the opportunity for a new way of thinking about working together, and offered new opportunities for developing better forms of organisation. It had the full backing of the Board and although its full implications could not be forecast they were convinced it was the right road for the future.

Safety was the Chairman's next subject, particularly the need for ICI to match the performance of the best American companies. He then turned to relations

conference 1969

Mr L. M. Hull (Paints) in the discussion on forming a 'staff action committee' explains how special meetings are held in his Division for staff representatives

with people outside the Company – stockholders, suppliers, customers. No big organisation could avoid some public criticism, but the important thing was to behave correctly, act in good faith and present one's case effectively. He gave as an example the control of effluents from new or existing plants. In ten years this would cost £60m in new equipment, plus operating costs by 1978 of as much as £11m a year. This would earn nothing which showed in the balance sheet, but it was an industrial and social requirement which should be known widely as Company policy.

After the question-and-answer session which followed the Chairman's speech came the announcement that the Board had agreed to last year's request for staff representation on the Staff Pension Fund's board of trustees. Three more are to be appointed, from candidates nominated through staff committees.

More discussion on pension matters followed – and then came the first new item on the agenda, the Staff Development Programme. This sparked off what many present thought was the best discussion of the day, with clear explanations of objectives and operating progress from Mr R. S. Wright, ICI Personnel Director, and Mr D. S. Mumford, an ICI Personnel Manager, before comments, suggestions and questions were heard from staff representing almost every Division. Among them was Mr R. A. Jeffcutt (ICI Fibres), who described the impressive progress already made at Fibres' Gloucester Works. Their comments and questions were then dealt with by Mr Wright and Mr Mumford, before the Chairman commented that many difficulties had to be solved – but the overall objective was so worthwhile that they *had* to be solved, even though it would take time.

Another highlight was a talk by Mr Albert Frost, ICI Finance Director, on ICI and money – why it is needed, how it is raised, how it is spent. His talk (which will be reproduced in a future issue of the Magazine) was followed by more questions and answers.

There was also a suggestion from Plastics for a special 'Staff Action Committee' to keep the Company in touch with staff views on important emergency matters, say when new Government legislation is on the way. This got a mixed reception and is to be considered more closely by staff committees. Another clear division of views came in the discussion of a Pharmaceuticals proposal that women staff should be given the chance of working until 62, instead of 60. An unusual point here was that all the speakers were women.

There is to be a working party to consider across-the-Company views on a proposal for doing away with Division agreements; a special committee is to consider developments in the Government's State pension proposals as they are likely to affect the Staff Pension Fund; and the Chairman promised 'sympathetic consideration' for a request submitted by HOC that staff should be guaranteed compensation against injury as the result of works accidents.

These, then, were the most important items in what the Chairman described as 'a very good meeting' – and some photographs of those involved are shown on these two pages.

Mr Peter Fordham (Plastics) who proposed that an 'action committee' should be formed to put forward staff views on important emergency subjects

Sir Peter Allen, Chairman of ICI, listens to a question from one of the 112 representatives who attended the conference from Divisions, ICI Fibres, Head Office and the UK Sales Organisation

Mr G. H. Wills (right), Head of Pensions Department, with Dyestuffs and ICI Fibres representatives during a lighter moment at the morning coffee break

Four of the Mond representatives were, left to right: Mr C. Lumb, Mr J. R. Angelbeck, Mr M. P. Clulow and Mrs S. Lloyd

Mr L. Gray (Agricultural)

Mr R. A. Jefcutt (ICI Fibres)

backyard astronomer

John Glasby

Photographs: Otto Karminski

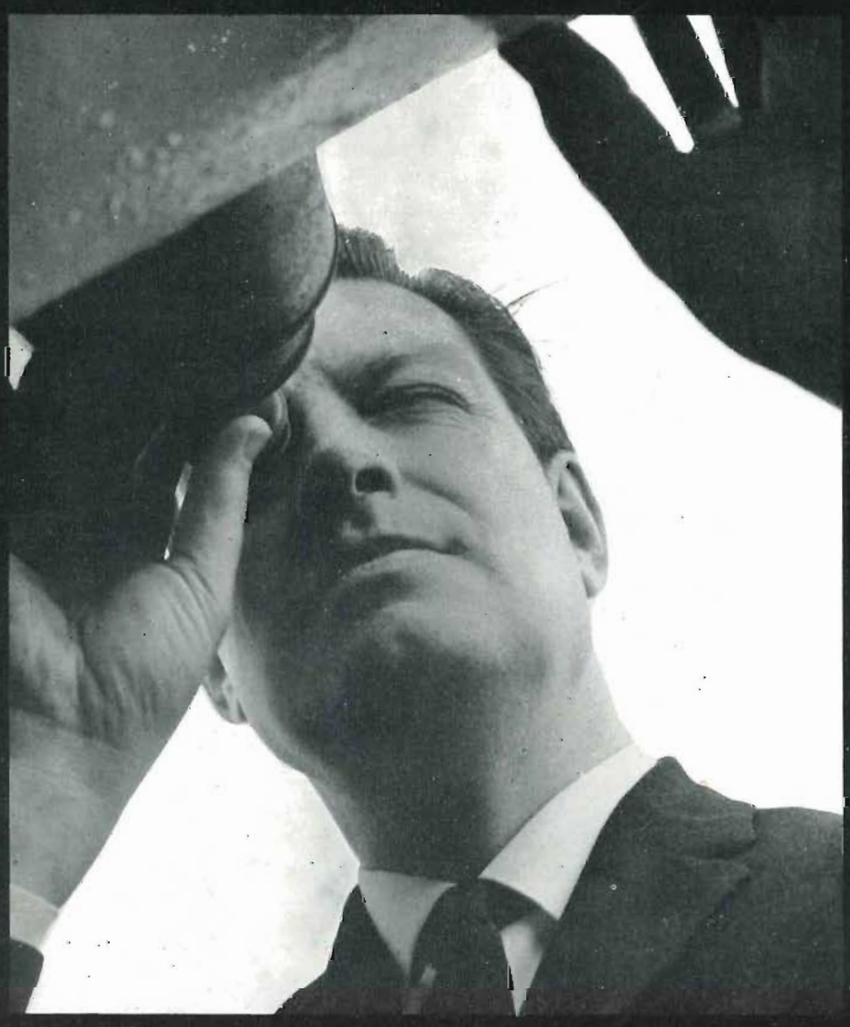
Since the recent spectacular developments in space travel, more and more people in every walk of life are taking an interest in astronomy. Those who go so far as to buy a telescope of their own, to do something more than merely 'look' at the planets and stars, are finding a hobby which is both interesting and of intrinsic value.

Until a few years ago, most amateurs were more interested in observing the sun, moon and planets, probably because they are easier to observe and provide a wealth of detail, whereas the stars are merely points of light in even the largest instruments. All of this is now changing. The various rocket probes being sent out to the nearer planets and now man himself on the moon, are yielding information which cannot possibly be obtained by telescopes here on Earth, and as time goes on, the role of the earthbound astronomer is likely to diminish as far as the moon and planets are concerned.

It will, of course, be many decades, or even centuries, before man reaches even the nearest of the stars and until that time comes there will always be an important part for the amateur to play in the continued study of the stars themselves. Anyone willing to exchange the fleeting thrills of the television screen for the timeless majesty of the night sky can be assured of a satisfying interest lasting a lifetime.

Most of the stars you can see on a clear, moonless night remain at exactly the same brightness all the time, but there are quite a number which change in brilliance. These are known as variable stars and not only are there several different types, each with its own peculiar behaviour, but so far there is only one particular class for which the cause of these recurrent changes in brightness is known.

Astronomers are now directing their efforts towards explaining the reasons why these stars brighten and fade like this, sometimes in a very regular way, often in a completely unpredictable and irregular manner. Before they can do this, of course, they must have as complete a record as possible of how the light varies. Since the large observatories, and the astronomers who work in them, are fully booked up for many years ahead on other problems, the task of following these stars rests with amateurs – using very modest equipment.



At the eyepiece of the 13-inch Browning telescope. It can magnify up to 1200 times. And by gathering light it 'sees' stars much too faint for the naked eye

'Some difficulty', says John Glasby, 'was experienced in laying ton-and-a-half, needed at least three feet of concrete to keep

Since 1964, I have been the Director of the Variable Star Section of the British Astronomical Association, and our programme consists of about one hundred stars of various classes, many of which have been continuously observed for almost eighty years. Another fifty or so stars of special importance to professional astronomers are now being added at the request of the Astronomer Royal and the International Astronomical Union.

Each observer is allocated a certain number of stars and makes a visual estimate of their brightness on each clear night by comparing them with nearby stars which do not vary and whose brilliance is accurately known. Some 12,000 observations come in to me each year and after checking, these are all plotted on special graphs to give what is known as the light curve for each star, thus telling us how the brightness has varied throughout the year. Reports are then written and sent to most of the world's major observatories.

With the thirteen-inch reflecting telescope I use it is possible, when conditions are good, to see stars about ten thousand times fainter than those just visible to the naked eye, and the number of variable stars within reach of this instrument runs into many thousands. Naturally, it is impossible to keep watch on so many, and one must concentrate on a few stars which are of particular importance to the professional astronomers.

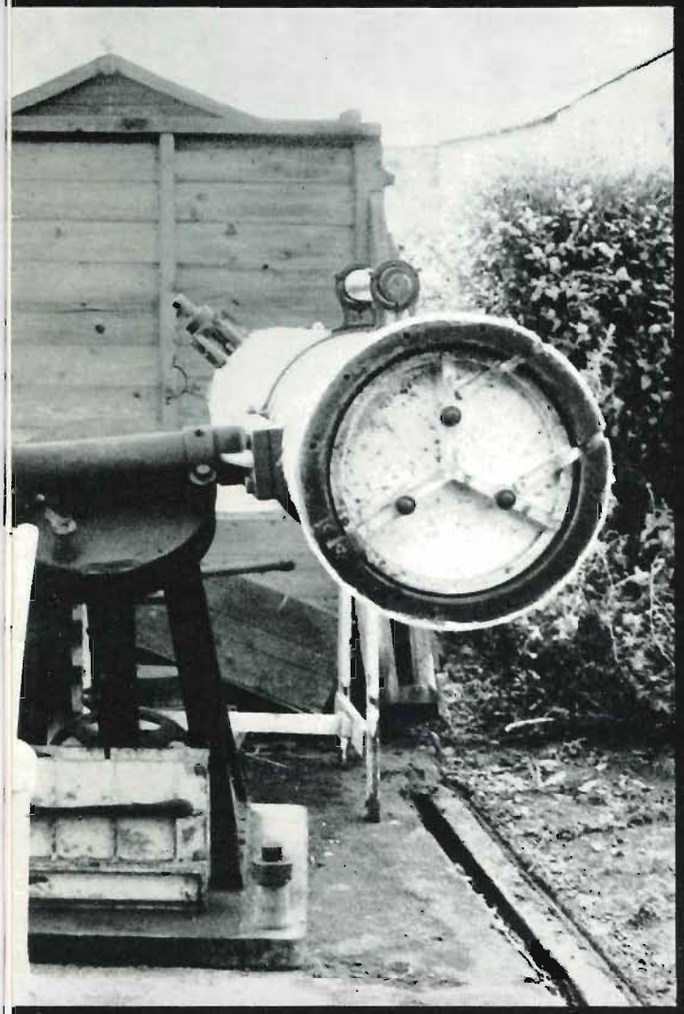
One question often asked is: How accurate are the estimates made merely by eye without the use of more refined equipment? So long as the star in question is white or yellow in colour, the results obtained are very accurate indeed. Unfortunately, some of these stars are red and here we run into difficulties because a red light does not affect the eye to the same extent in different people. In spite of this, however, the observations are reliable enough for our purpose.

Nowadays, we know a great deal about the various kinds of variable stars, and we owe much of this knowledge to the efforts of amateur observers. It is perhaps worth remembering that until the advent of celestial photography towards the end of the last century, almost all of the original discoveries were made by 'backyard' astronomers using very small telescopes who watched the stars, night after night, looking for any which changed in brightness when compared with their more sedate neighbours.

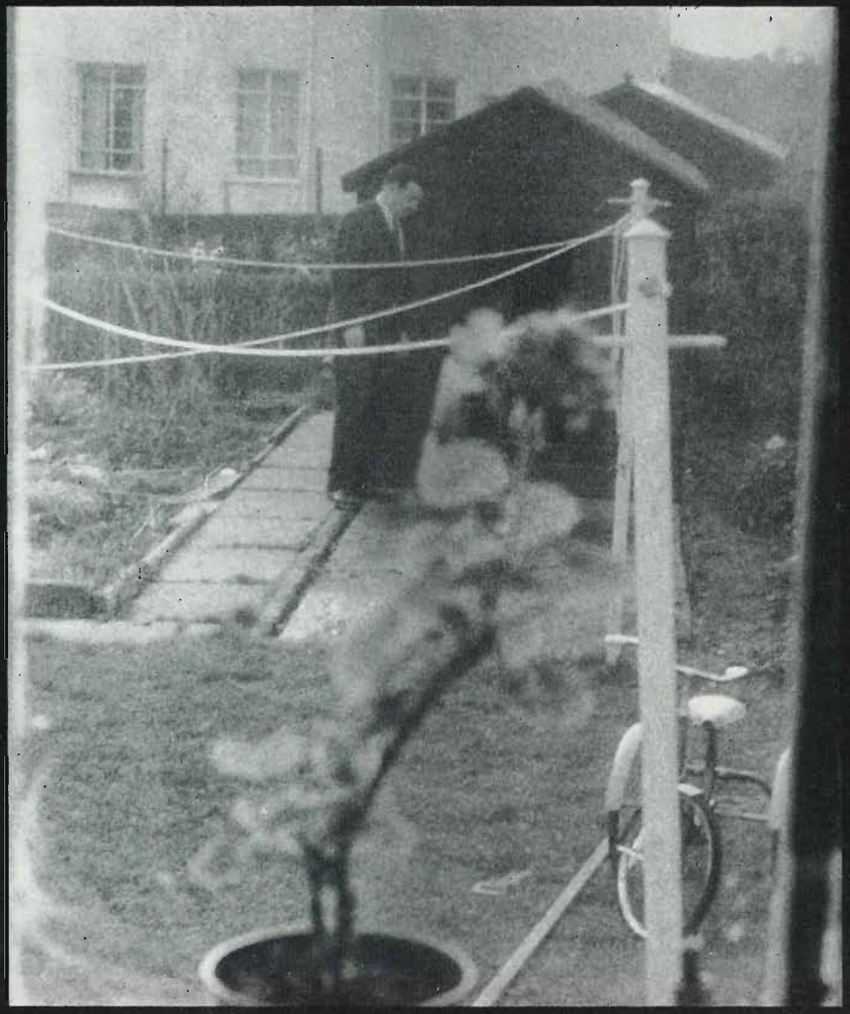
One particular kind remains at nearly the same brightness for most of the time; but every few nights, at regular intervals, it suddenly fades for an hour or so and then returns to its normal brilliance, repeating this cycle endlessly. For a long time, people were completely puzzled by this behaviour. One such star is very bright and was well known to the ancients, who likened it to the slowly-winking eye of the evil Gorgon, carried by Perseus across the heavens.

We now know that these variables are, in reality, two stars, one bright and the other faint, which go around each other, rather like the moon going around the Earth and each time the faint star passes in front of its brighter companion, it cuts off some of the light which reaches us. We call these stars eclipsing variables.

Other variable stars are quite different. Some are believed to be really huge stars, so large that if one of them were to replace our own sun, the Earth would actually lie inside it! Because of their tremendous



the concrete base.' Hardly surprising: the telescope weighs a down vibration. Quite an operation in your own backyard



Apart from the rear end, the whole shed can be run off along the grooves in the concrete apron, leaving the telescope in the open, free to swing in any direction

size and the fact that they are older stars than the sun, it is thought that they have reached a point in their careers when they are no longer stable and that they rhythmically swell up and then contract, rather like a heart beating.

Now, it may be thought that as the star becomes smaller it will get fainter, and as it grows bigger it becomes brighter, but actually the opposite is the case. This is because as it expands it becomes cooler, while as it shrinks it grows hotter and gives out much more light. It is indeed fortunate for our continued existence that the sun is not such a star – although it is possible that many millions of years from now it will be – for if we were not all frozen solid by the cold, we would certainly be burnt to death by the heat a little while later.

One other question often asked is whether any new stars appear in the heavens. At times, an apparently new star does appear which may sometimes outshine the brightest of all the stars. After a few weeks, however, such stars begin to fade until they are no longer visible except in the very large telescopes.

It was originally thought that these stars came into existence spontaneously but photographs taken before the sudden brightening show that a very faint star was present in that position; a star which suddenly exploded and hurled a large cloud of very hot gas into space. These stars are still known as *novae*, a name given to them when they were still thought to be completely new stars.

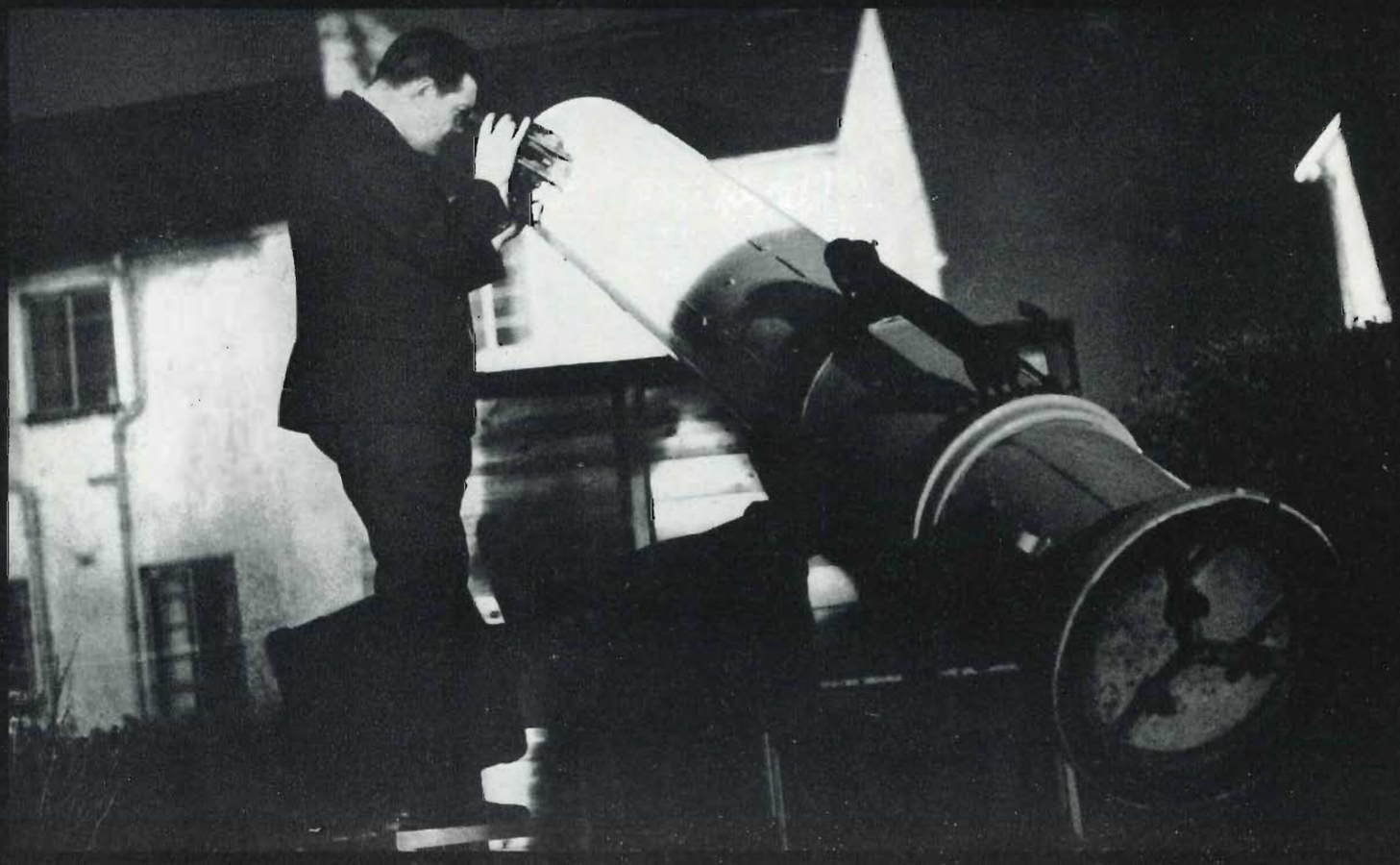
In October 1572 and again in 1604, two similar stars appeared which were so bright that they were visible in the daytime. These truly remarkable objects are known as *supernovae* for a very good reason. Whereas an ordinary nova simply throws off its outer skin during the explosion, a supernova actually blows itself to pieces!

Such cataclysmic eruptions are, naturally, quite rare and it has been estimated that, on average, we may expect to see one – without the aid of the largest telescopes – once every five hundred years. Since two appeared within thirty-two years of each other only four hundred years ago, it will probably be a further century before the next is seen.

Apart from the satisfaction gained from carrying out investigations which are still of real scientific value to the professional astronomers, there are other compensations to be had from watching the stars. The long winter nights when the stars stand out in their thousands, sharp and crystal-clear against a jet-black background; the warm summer and early autumn nights when even the stars seem to possess a more mellow light; but above all, the sensation one has of the utter immensity of the universe and of how little our own troubles really count when judged against the infinity of space and the eternity of time.

The would-be astronomer will find that this need not be a costly hobby. A four-inch reflecting telescope can be purchased as an easily-assembled kit for as little as £10 and a six-inch reflector, with which the owner can observe many hundreds of variable stars, can be bought for about £30.

The greatest satisfaction, of course, undoubtedly comes from taking part in a communal programme of observing, and the amateur astronomer can do no better than join the British Astronomical Association whose headquarters are at 303 Bath Road, Hounslow West, Middlesex, and becoming an active member of one of their observing sections. He may then be assured that his work will be as useful to the science of astronomy as a whole as it will be interesting to himself.



One axis of the telescope mounting is aligned on the celestial North Pole. A star can thus be followed across the sky with one movement only. For taking photographs the driving mechanism will do this automatically. This makes visual recording or observations a lot simpler

don't just sit-pose!

Margaret Reekie interviewed photographer Ray Harwood, who took these swimsuit pictures for ICI Fibres in Cyprus. He passes on some of the professional tips that make these models look so lovely

'It's the natural look that makes a good picture,' says Ray Harwood. And curiously enough it's careful posing that makes a picture look natural – and makes your girl-friend look her best.

First, make your own (preferably silent) analysis of your girl-friend's figure. If it's good all the way down, Ray suggests isolating her against the sky (picture A) taking your picture from low level. If her legs are not her strong point, still isolate the figure but hide her legs in the sea (picture B). The 'wet look' here gives the most natural look of all – and a wet swimsuit clings much more closely. Wet hair can look fine but not straggling across her face.

A kneeling pose adds uplift to a good bust (picture C) but gives no help to a bulging waistline.

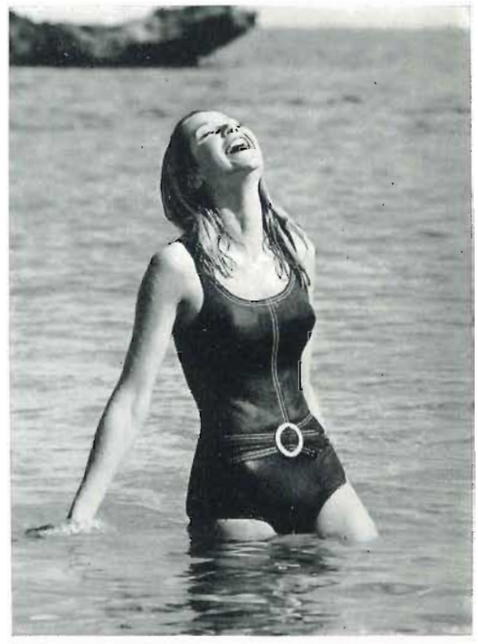
For a sitting picture, contrive a setting that makes full use of natural objects. Make your model point her feet to give extra length to her legs (picture D). Never mind being comfortable. If you can find a boat with interesting shapes in its gear (picture E) get her to sit well forward on the edge to give her whole figure a good line.

For that sun-soaked look, try a sitting-on-the-sand pose (picture F) shooting down on to the sand to keep the figure well clear of the skyline. Put sand over her suntan, as on the right leg here, and remind her to point her toes. Raise one knee above the other and tell her to stretch up – with no midriff sag. She won't want to hold this pose for long, so do your calculations first.

Ray has a good tip for getting that delightful smiling-into-the-sunshine look (picture G). Unless the girl looks up to the sun, her eyes look like shadowed pools of blackness. But clearly she can't stand the bright sunlight for long.

So tell her to shut her eyes while you set your camera. When you are absolutely ready, count aloud '1, 2, 3 and open', and press your button on that instant.


A


B


C


D

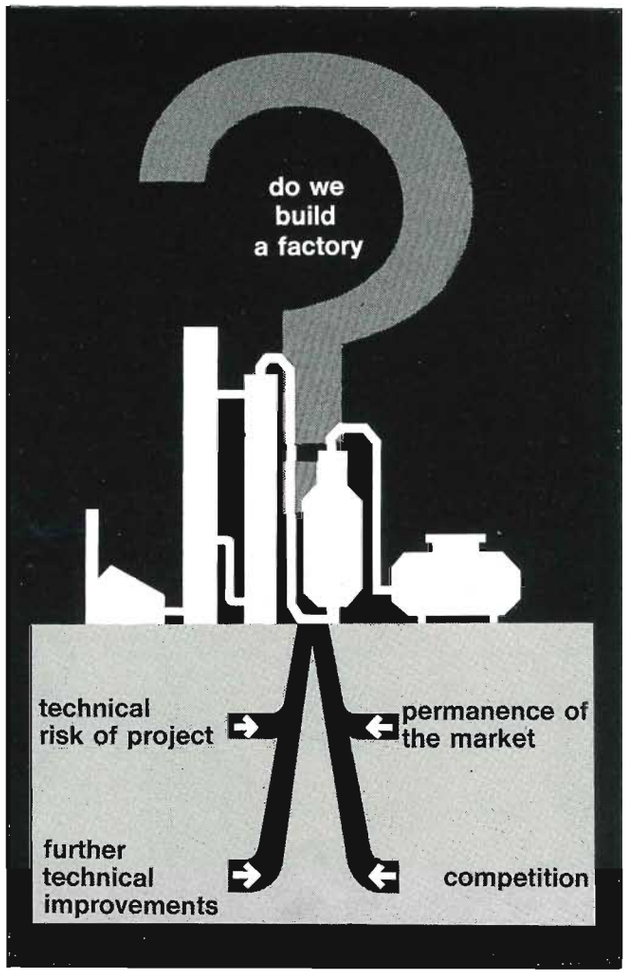

E


F


G

counting the cost

Many of us work in offices, in laboratories, or on works, and are concerned with buying or selling, or making products, or maintaining plants.
But there has to be a plant to use the raw materials and to make the products for sale to our customers. As chemical plants are expensive, the ICI Board have to agree before a plan to build a plant can go ahead. What questions have to be answered before the Board decides to build a plant and where does the money come from to pay for it before it has made any product? Last year ICI paid £125 million to build new plants; the larger the plants and the more they cost, the more important and difficult these questions become. The questions are fundamental to the business of making chemicals anywhere and have to be answered by all our competitors as well as ourselves. The continued growth and prosperity of ICI depends on our answering these questions correctly. In the book *Chemistry and Industry*, edited by Dr D. G. Jones and published by the Clarendon Press, Oxford, there is a chapter on 'The economics of chemical processes'.
Principal author of that chapter is Mr R. N. Quartano, managing director, Engineering, Chemical and Marine Press Ltd, publishers of *European Chemical News*, a journal specialising in the techno-commercial aspects of the chemical industry. This article, based on that chapter, outlines some of the main costing problems involved



Some of the key questions to be asked and answered before the decision whether or not to invest in a new manufacturing project can be taken

In the business of making money from chemicals, three people play a decisive and distinctive role: the director of a company, the production manager and the sales manager. As a result of the director's decision, a plant will be built, and the production manager has to run it as efficiently and economically as he can. The sales manager has to take the product from the plant and sell it to the company's maximum advantage.

Operating at the highest efficiency means first, producing just the amount a company can sell – no more and no less; second, producing it at minimum manufacturing cost. Manufacturing cost means the cost of all the raw material, catalysts and chemicals, steam, power, water, wages, maintenance, technical services, overheads and insurance which go into the making of one ton of the product. The relative importance of these items varies from product to product, but usually in the heavy chemical industry raw materials and utilities (steam, power, fuel and water) are the most important.

How costs are built up

To see how the costs per ton of making a product are built up, let us look at those involved in making phenol in a plant designed to produce 20,000 tons a year, by the Hooker process, [not practised in ICI] using benzene, hydrogen chloride, air and a catalyst.

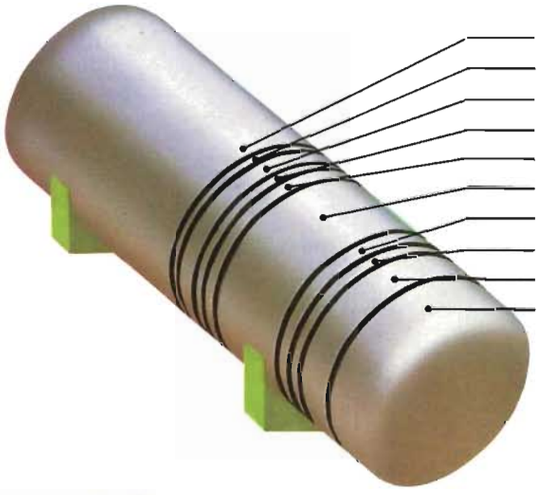
Theoretically, in the process used, 0·83 ton of benzene should produce one ton of phenol, but in practice it requires 0·93 ton of benzene; i.e. the yield is 90 per cent.

(continued on page 182)

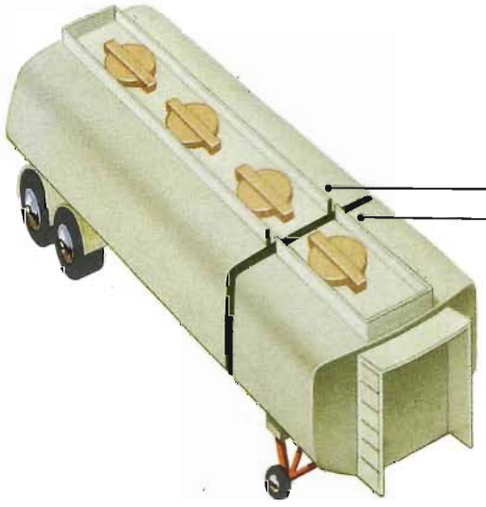
-in chemicals

The reckoning, step by step. How production and associated costs per ton of phenol build up until the final surplus remaining from the sale of each ton is reduced to *two shillings*

Production costs of 1 ton of phenol from a 20,000 tons a year plant

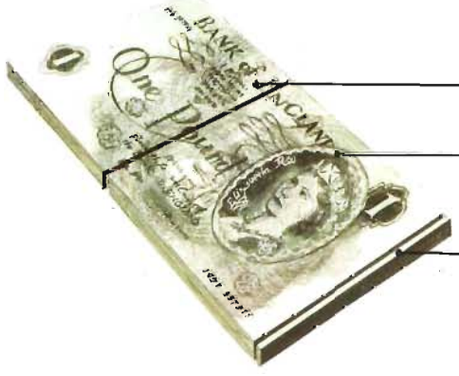


£24 - 4s	0·93 benzene @ £26/ton
10s	0·02 ton HCl @ £24/ton
£1 - 12s	catalyst
16s	power @ 0·85d. kwt
£1 - 0s	water @ 6d/1000 gallons
£8 - 12s	steam @ £1/ton
£1 - 8s	fuel
16s	labour
£3 - 12s	maintenance
£3 - 10s	plant overheads
£46 - 0s	**total cost (per ton)**



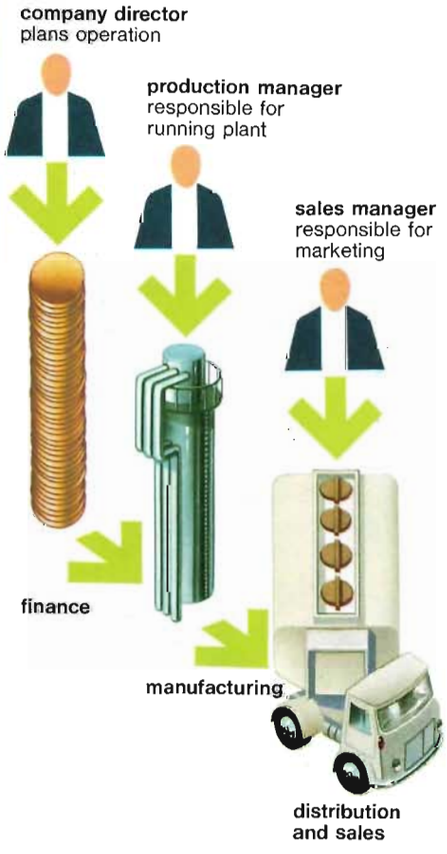
	additional costs
£7 - 0s	average transport costs
£3 - 0s	technical and sales costs
£56 - 0s	**delivered cost (per ton)**
£3 - 10s	**research and central management**
£24 - 10s	**margin**
£84 - 0s	**competitive selling price**

allocation of margin



£9 - 16s	tax
£14 - 12s	repayment of initial costs of plant and capital charges
2s	surplus remaining
£24 - 10s	

In the business of making money from chemicals, three people play a decisive and distinctive role: the director of a company, the production manager, and the sales manager



ICI in your garden

The jobs you do in a garden can be *creative* – the making and maintaining of lawns, the growing of flowers, shrubs, vegetables. Or *constructive* – the building of a greenhouse, a frame, a cloche, a tunnel, or a pond. Or *defensive* – protecting the things you grow (sometimes, with insects, yourself too) against the pests that attack them, or the British weather. Whichever of these jobs you do as the year runs round, an ICI product can probably help. Our picture shows just how and where some of these products play a part in the garden.
Code for different Divisions of ICI is:
PPL – Plant Protection Ltd. (subsidiary of Agricultural Division) **PL** – Plastics Division
P(H) – ICI (Hyde) – part of Paints Division **PH** – Pharmaceuticals Division

1 'Weedol', based on ICI's chemical Paraquat, enables you to weed among plants safely, easily and quickly. Does not hurt roots, since it becomes harmless on touching soil. With special applicators, you sprinkle it just where you want it. **PPL**

2 'Rose Plus', rose food contains slow-release magnesium among other vital ingredients for greener leaves, brighter, stronger roses. **PPL**

3 'Lawn Plus' feeds and weeds your lawn at the same time. Granules, treated with two selective weedkilling chemicals, release lawn food – *and* kill most lawn weeds. Sturdy, specially-designed spreader helps to distribute them evenly over lawn. **PPL**

4 'Garden Plus', all-purpose organic-based fertilizer, puts back into soil what plants take out. For flower beds, lawns, shrubs, fruit and vegetables alike. **PPL**

5 'Liquid Plus', rich liquid manure for greenhouse and garden. **PPL**

6 'House Plant Plus', essence of natural plant foods, complete with measuring spoon and notes on looking after house plants. **PPL**

7 'Abol' X, a greenfly and blackfly killer which enters the sap stream of the plant and protects it for up to a month. Also with press-button hand spray and dosage spoon. **PPL**

8 'Sybol' general insecticide, kills caterpillars, beetles, weevils, greenfly and most other garden pests. **PPL**

9 'Verdone' selective lawn weed-killer, destroys most lawn weeds and their roots. **PPL**

10 General Garden Fungicide controls many different plant diseases, e.g. mildews, black spot, rust, grey mould, scab, and blight. **PPL**

11 New Sodium Chlorate for paths, waste ground, drives, kills all weeds, has just been made safer with fire depressant to reduce danger of combustion. **PPL**

12 Slug Pellets attract and kill slugs quickly and stand up to weather very well. Their container is a re-usable flower pot. **PPL**

13 Antkiller kills ants, wasps, earwigs, woodlice, is supplied in polythene puffer packs. **PPL**

14 Club Root Control contains calomel dust for checking club root in cabbages and similar plants. **PPL**

15 'Abol' Derris Dust kills most garden pests, including red spider. **PPL**

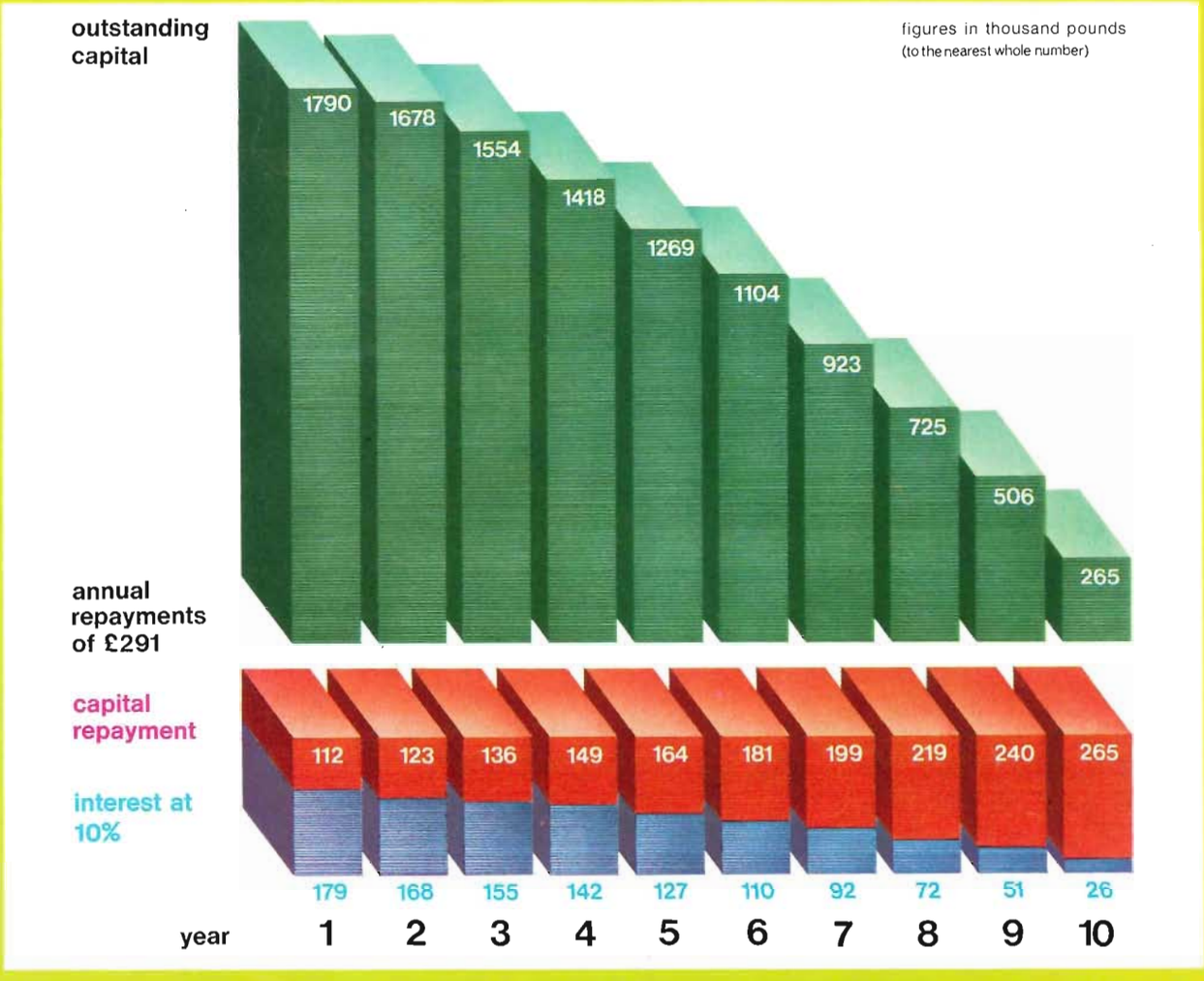
16 Mosskiller for Lawns not only rids them of all common mosses but tones up grass too. **PPL**

17 'Flypel' cream protects you in the garden – or anywhere else for that matter. Keeps flies, midges, gnats, mosquitoes away, smoothes easily into your skin without being greasy. **PH**

18 Garden tools: grips on new range of Wilkinson Sword garden tools are injection-moulded from 'Propathene' to give lightness and strength. Shafts are covered in PVC sleeve, too, for extra protection against wear and weather. **PL**

19 Lawn mower: more than 20 components of Qualcast Ltd.'s Super Panther battery-driven lawn mower are injection-moulded from 'Propathene', ICI's polypropylene, and 'Maranyl', ICI's nylon compound. Structural parts are lighter, working parts resist friction better. **PL**

20 'Novolux' cloches made from ICI's transparent rigid vinyl sheeting can be put up in half a minute. They are lightweight, rotproof and do not corrode. As transparent as glass, they admit more infra-red rays, allow soil and air to heat up faster. 'Novolux' is also very widely used for greenhouses, plant-houses and frames. **P(H)**



Paying back the borrowed capital. As the ten-year period goes by, *capital repaid* rises steadily in proportion to *interest paid*

Likewise, small losses of hydrogen chloride amount to 0·02 ton HCl per ton of phenol produced. Again, not all the catalyst is recovered, and these losses add a further material charge.

Benzene, hydrogen chloride and the catalyst have to be purchased, though air is free. There are also four utilities used: power, steam, water and fuel. Fuel and power are bought, and steam is produced by the company itself at, let us suppose, about £1 per ton. Water, used for cooling, for boiler feed-water and in the process, costs little in itself, but the cost of pumping and purifying it can become a small but significant item.

The labour costs of operating the plant are not high in terms of cost per ton of the product, but maintenance costs, which include the cost of wages for fitters, electricians and other tradesmen, can be expensive. Experience shows that annual maintenance charges are a fixed proportion – about 4 per cent – of the installed cost of the plant, i.e. of the total cost of preliminary civil engineering work, of equipment, piping and steelwork, plus erection costs and design fees. Since the installed cost of our 20,000 tons/year phenol plant is £1,790,000, the annual maintenance charge is £71,600, while the charge per ton of phenol produced is £3·6.

The term 'overheads' covers the cost of central services provided by the company: administration, technical services, transport, canteens, medical services, etc. Overheads are often expressed as a percentage of the labour and maintenance costs. A breakdown of all the foregoing costs is shown in our diagram on page 179.

The costs related to the production of one ton of phenol can be divided into two groups. The first consists of such items as raw materials, catalyst and utilities: they are always the same *per ton of product*, however many tons are produced.

In the second group are labour, maintenance and plant overheads. These charges are the same per year *however many tons in the year are produced*, because the size of the labour force does not usually depend on the rate at which a plant is working – at least not with large plants used in continuous processes. Therefore, the burden of the second group of charges is *greater* per ton of product if output is low and *smaller* if it is high. In our diagram on page 179, it has been assumed that the plant is working to its full capacity of 20,000 tons of phenol per year.

Just as there are costs associated with making a ton of phenol, so also are there costs associated with selling it. Before the sales manager can decide a selling price, he has to work out what these costs are.

The main cost will be for distribution to customers, which will depend very much on the average size of the delivery and on the distance the phenol has to be carried. However, the sales manager can easily calculate the cost of transporting 20,000 tons/year, and he arrives at a figure per ton of phenol – say £7 a ton.

There are other selling costs, such as the cost of the sales organisation itself and of any technical service it needs. Generally, the larger the volume of sales and the more established the product, the lower these technical

and sales costs will be. With phenol, they might add £3 a ton to the overall costs of selling the products.

The sales manager now has a figure of £56 a ton for the delivered cost of one ton of phenol. Suppose he finds that the highest price he can get for phenol in the face of competition is £84 a ton and that he can sell 20,000 tons at this price. Total sales revenue will then amount to £1·68 million against total delivered costs of £1·12 million, leaving a cash surplus of £·56 million, or £28 per ton of phenol sold.

The company management now has to use this money to pay certain other charges associated with the manufacture of phenol. One of the first claims is the cost of company research. Because the company's future depends so much on this activity the main board decides how much to spend on it. In petroleum chemicals, this will be about 3 per cent of the annual turnover.

The second claim is the cost of the central management itself; head office, management salaries, etc. The third claim is taxation on profits, which are defined as the money left over after all the fair costs of engaging in business have been paid. In this case, costs of research and central management could amount to £3·5, leaving £24·5 a ton subject to tax. If we assume tax at the rate of 40 per cent, the management is left with only £14·7 per ton.

It might well seem that no further charges could possibly be made against the £14·7 that results from making a ton of phenol. All plant operating costs have been paid, all overheads, the cost of central management and research – and finally the tax on profits.

Paying for the plant

Unfortunately, there is still something which has not been paid for: the plant itself. The one we have been considering cost £1·79 million to build, and this is only a small plant. A 300,000 tons/year ethylene plant, for example, would cost about £14 million.

The money for the plant had to come from the savings of the company itself, from banks or institutions such as insurance companies, or from private individuals who gave the company money in exchange for shares. This money, or capital, is the raw material of industry. Like any other raw material, it bears a cost which has to be paid. Capital, however, is unlike an ordinary commodity in that its cost is always expressed as a hire charge, called the rate of interest. Like every other charge connected with the production of phenol, the hire charge of the capital used to build the plant has to come out of the earnings made by selling the phenol.

But plants grow old, and their technology becomes obsolete. So a company cannot invest capital in plant and sit back happily because the plant is earning enough to pay the hire charges. It must also earn enough to pay back the capital, so that by the time the plant is ready for scrapping the company has recovered its original outlay. It will usually re-invest this money in new technology and new products that can maintain its earnings.

Let us assume that the economic life of a phenol plant is ten years and that the hire charge, or interest, on the capital invested is ten per cent. The management will want to calculate how much of the £14·7 still left should be earmarked for paying back the capital *and* the hire charges on it. The simplest way is to set aside a constant amount of money each year of the life of the plant, and for our plant, for which the capital investment is £1·79 million, the required annual sum is £291,000. The ten-year cycle of repayment is shown opposite on page 182.

Paying for the capital

Each year, the amount required to pay the interest on the outstanding capital is subtracted from the £291,000. The remainder is then used to reduce the balance of outstanding capital. By the end of the tenth year, all outstanding capital has been paid back, while the hire charges paid (i.e. the interest) during the life of the plant amount to £1·12 million.

Dividing the annual charge of £291,000 by the 20,000 tons of phenol produced gives a charge against each ton of £14·6.

If the sales revenue per ton of phenol is enough to provide this amount as well as all the other production charges and the tax liability, the management can at last relax in the knowledge that the plant is operating at a profit. And it is, in fact, just enough – there is £0·1 per ton left over – *two shillings*.

Let us suppose now that ten years have passed and the consumption of phenol has grown such that the management decides it could sell the production from an 80,000 tons/year plant. This will cost £3·9 million, and £635,000 has to be set aside every year to pay back the capital and interest. Dividing £635,000 by 80,000, we find that the charge against each ton produced is £7·9. Why is the charge so much lower for the larger plant?

The reason is that the capital cost of a plant such as our phenol plant does not double when the capacity doubles. The only items that increase in proportion are those few where the increased output is achieved by using a greater number of items of the same size. For most duties, increased output will be achieved by using the *same* number of items but *larger* in size.

As the capacity increases beyond a certain point the fall in capital cost per ton becomes smaller. Even so, the fact that the capital element per ton of production decreases as the plant grows bigger is one of the most important driving forces in the chemical industry today. It puts the big producer at a competitive advantage over the small one, even allowing for the cost of servicing and repaying the capital.

Choosing the right size

But if the large plant offers a great potential advantage, it also carries greater risks, chief of which is not having a large enough market to absorb its production. The operator of an 80,000 tons/year plant may sell only half his potential production, but he must still put aside the same amount of money each year to repay the capital and interest. Each ton of phenol will therefore carry twice the charge it would have had to carry on a throughput of 80,000 tons. By building a plant larger than he needs, the owner of the 80,000 tons/year complex would thus put himself at a very severe disadvantage. Choosing the right size of plant, then, is one of the most critical decisions the management has to make.

As a Company, ICI is very export-conscious. In 1968, Group sales overseas, which include both exports from the United Kingdom and goods manufactured or merchanted by subsidiary companies abroad (but do not include the sales of overseas associated companies), amounted to £620·9 million, and for the second successive year exceeded the level of home sales. This represents 50·19 per cent of total group sales of £1237·3 million: the equivalent of nearly £1200 for every minute of every day of the year. The reward for all this effort can be quite staggering. Apart from the obvious satisfaction of bringing in more revenue, there is the merit of helping to relieve the country's balance of payments crisis. The Queen's Award to Industry has become the coveted Exporters' Trophy, given in recognition of outstanding achievement in industry, either for increasing exports or for technological innovation. And ICI is the only Company in the whole country to have received an award every year on both counts

Cyril Cowley

EXPORTING CAN BE FUN

From the sampans of Hong Kong harbour to the barges on the busy Rhine, from the coasters plying along our own shores to the deep-sea freighters crossing the oceans, from the latest container ships to the largest oil-tankers, goods move ceaselessly between one country and another.

Nor is sea trading the only means of exporting. There are many more, from the humble camel in the Sahara to the Trans-Siberian Railway spanning two continents and nearly half the globe. Nor should we forget the long-distance lorry racing down the motorways of Europe or America, or the freight plane with a high-value cargo urgently needed in the fastest possible time. All these forms of transport are means to the same end.

How does it all add up in terms of hard cash and tonnages? In 1967, for example, exports for the world as a whole (excluding mainland China, the USSR, and other East European countries for which no figures are available) totalled some £78,833,330,000. And the UK share of this sum was about £5,769,583,000, third in world ranking only to the USA and West Germany. In that same year, 89,471 vessels entered UK ports, carrying 144,529,000 tons of goods, while 89,296 vessels sailed out from these shores with 143,394,000 tons on board. So exporting is big business.

For the UK in particular, its scale and its variety reflect just how important exporting is. The British Isles, a densely-populated area, enjoys one of the highest standards of living in the world. To keep this standard up, we have to import many commodities. Either we cannot or do not make them here – or when we do make them, we don't make enough to go round and meet the home demand.

So to pay for these imports, we have to sell our own surpluses, not needed on the home market. At the moment we import more than we export and the result is a recurring balance of payments crisis. In other words, we as a nation are living beyond our means. Adjustments have to be made by the Government to cut domestic spending and release more of our own products for export until the books are balanced. Ideally, we should export more than we import.

Easier said than done, particularly when so much has to happen before any given export is completed. Orders come in all shapes and sizes, from a few ounces of one product to as many thousands of tons of another. For real bulk, say 250 tons and over, it is usual to charter a whole ship, because this method is cheaper.

Small parcels usually cost more in proportion than bigger ones, since the carrier has a Minimum Bill of Lading charge – a minimum cost per lot handled. In general, cargo is rated on either volume or weight carried. If someone wanted to ship a load of feathers, payment would normally be according to the volume of space occupied.

On the other hand, a ship carrying iron ore, for instance, will be down to its loading-marks before it is full and so will be charged for the weight carried.

Many years ago, before international maritime codes of practice were established, it was quite common for an unscrupulous owner to allow his vessel to be loaded to such an extent that it imperilled the lives of the crew if heavy seas were encountered. In 1876, as part of a better deal for sailors, Samuel Plimsoll introduced what has since become known as the 'Plimsoll Line' – a symbol which is painted on the side of every ship indicating the line below which no vessel may be loaded. Special lines operate for winter and summer voyage loadings.

There are other factors which must be taken into account, either in the actual handling or in the charging or both. In the chemical industry dry chemicals and liquids each demand entirely different handling techniques. Many products also offer a hazard of one kind or another; they may be inflammable, poisonous, corrosive, or gaseous, all of which influence the way they are handled. Packages have to be developed to conform to a very rigid code approved by the Ministry of Transport and various national and international bodies throughout the world.

An inflammable liquid in a ship going to the Far East may pass through extremes of temperature which add to the carrying risk. When carried in drums, such cargo is normally called 'deck-cargo'. This gives the ship's captain the absolute right to jettison overboard if it becomes a risk either to the ship or to its crew. The freight rate for such a commodity will reflect this degree of risk and special insurance must be taken out.

There can be no such thing as a typical export order, especially in a company like ICI making 12,000 products. The job of getting the material from factory to customer involves a number of people and a series of stages. First, the order clerk will 'raise papers': the popular expression for commencing documentation. It includes the acknowledgement of the order; the requisition for the material; the applications for shipping space and for domestic transport; and the arrangements for insurance.

The requisition for the material is then sent to the packing point with a request to pack up and mark the quantity needed for the order concerned. Next, samplers will normally draw off small quantities for laboratory analysis to check that the product meets ICI's and the customer's specification. The packing point will then advise the order clerk that the material is ready to be collected and delivered to the docks.

The order clerk must now book space on a ship and organise local transport. Here, further difficulties could easily develop—and often do. With a home order to a destination in the UK, a lorry can arrive an hour or two late without the consequences being too disastrous. With an export order, an hour's delay in delivery could mean that the driver arrives at the dock just in time to see the ship sailing to your market, with possible delays of another month and so you may lose the order completely. Your customer will lose confidence in you and will look around for a supplier who gets the goods there on time. Your whole selling effort will have gone for nothing.

Documentation tends to be rather more demanding than for a home order. Apart from the basic invoice, there must be a Bill of Lading (the ship's receipt for the safe delivery of your goods to the vessel, which must be produced at the receiving end when the goods are collected); an insurance certificate, and, for certain countries, a certificate of origin, a consular invoice, a health certificate, a certificate of analysis, a chamber of commerce certificate and so on. If all this sounds confusing, exporters can take heart: a number of the most commonly used export documents have now been redesigned so that they can be prepared from one master document. This simplifies matters enormously by cutting out much repetitive typing, checking, and other possibilities of error.

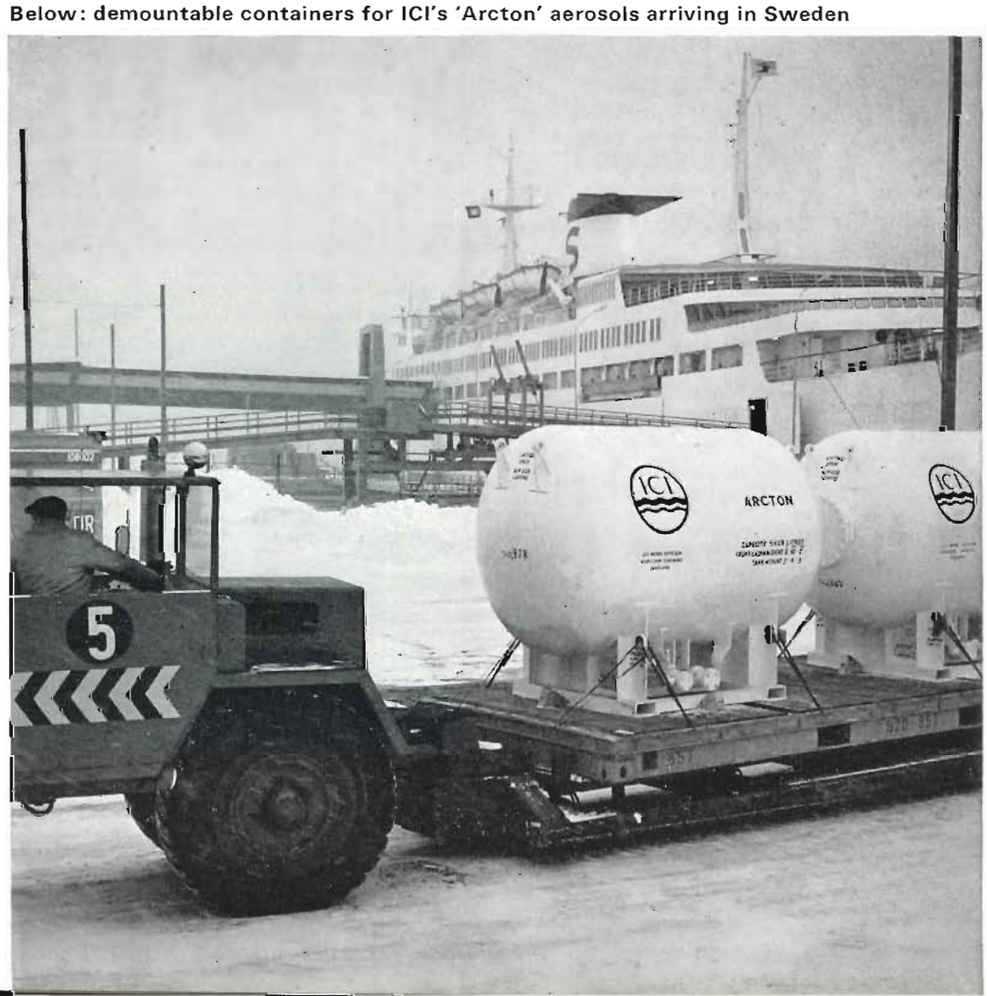
Finally, you must advise your customer of the particulars of the carrying vessel so that he can arrange transport to collect the goods from the ship when it gets there. Everyone is pleased to learn that the consignment has arrived safely, on time, and in mint condition. The delivery pattern has now been established and, in many cases, you can look forward to many repeat orders. With some justification you can at last stick out your chest and boast – 'another satisfied customer.'

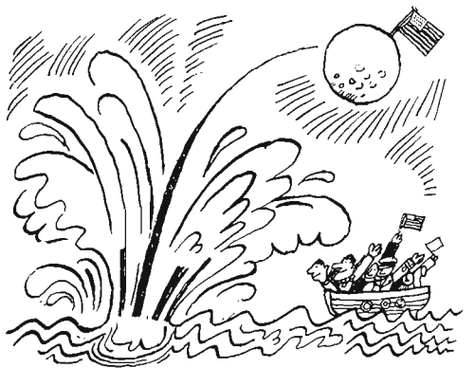
I particularly enjoy export work for a number of reasons. For example, I enjoy my day-to-day contacts with our numerous overseas agencies. There's a thrill about picking up my 'phone and asking the operator to get me ICI Rozenburg; or of reaching for my teleprinter pad and drafting a cable to Brazil or Pakistan; or of receiving an order or letter in from one of the many Continental countries; of plotting imaginary road-tanker journeys behind the Iron Curtain or sea-routes to far-away ports which avoid use of the Suez Canal; of making names 'live' which were once dull episodes in my school geography lessons; of meeting overseas customers when they visit us and, most of all, of the gratitude of a foreign buyer when a difficult order gets through without a hitch.

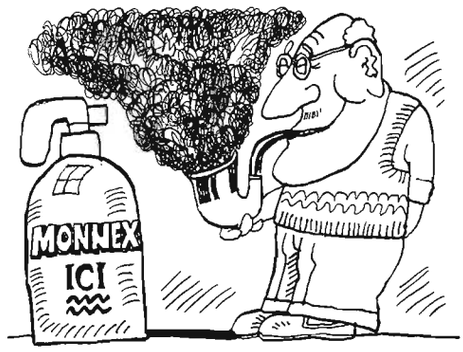
It is an activity in which one must always be learning – no-one knows it all. Indeed, the combined knowledge of all members of an export group is frequently brought to bear on quite a routine enquiry.

After only the briefest acquaintance with exporting, one appreciates just how immense the world really is . . . and also how small it is. Who knows, within the next decade, we may be exporting commodities essential to the comfort and well-being of those who emigrate to the moon!

Opposite: serried ranks of drums hold a bleaching powder made by ICI, form part of an export consignment.
Below: demountable containers for ICI's 'Arcton' aerosols arriving in Sweden







All clear for new agreements

The announcement at the Central Staff Conference that approval for introduction of the Staff Development Programme had been received from the Department of Employment and Productivity (see Conference report, page 172) was one of two significant and far-reaching 'personnel' events during July. The other was the final ratification by the Signatory Trade Unions of the new Weekly Staff Agreement.

Announced on July 17 in a joint statement to managers, supervisors, shop stewards and full-time officials of the unions involved, ratification meant that on Monday, July 21, about 6000 employees at seven different factories went on to WSA conditions and salaries. They are at Clitheroe, Darwen, Dumfries, Gloucester, Hillhouse, Immingham and Stowmarket, and all had already been operating under full MUPS (Manpower Utilisation and Payment Structure) trials conditions for varying periods of time. On all other sites, WSA conditions and salaries will be introduced when local discussions have been completed and agreement reached. Discussions are now going ahead at 13 sites, involving about 12,000 employees.

The new agreement is the result of about nine months' intensive work throughout the Company on a revision of the MUPS trials agreement, which had been operated at a number of works over a two-year period.

It offers salary increases averaging about 20 per cent over present non-MUPS earnings for about 60,000 employees in the UK – and it also offers other benefits to both the Company and to individuals. These include better use of time, knowledge and skills; full employee involvement in discussions about change; more flexible working arrangements, redundancy safeguards; safeguards for union interests, local agreement on work changes; a new policy of union membership; and more training.

'Monnex' – a new firefighting powder

Year by year the risks of fire in industry and business grow greater as property and installations become more valuable. Between 1963 and 1968 the cost of fire in the UK rose from £66·4m to £100m, with similar rises in most industrial countries. Fire protection is thus a promising area for new products.

A new firefighting powder, 'Monnex,' invented by Mond Division, has several times more power for its weight than any existing dry powder, and knocks down flames more rapidly. It works against fires of burning liquids and gases, and can be applied from hand extinguishers, tenders and automatic systems.

Likely high-risk situations where 'Monnex' will find applications are in oil refineries, paint, polish and other solvent-using factories, and on airfields. The enhanced power of this new agent offers greater protection and margin of safety with a given size of appliance. Alternatively, it allows a given risk to be protected with a smaller and so less costly appliance. 'Monnex' is based on a completely new and patented crystalline chemical, which breaks down in the flame to blanket the fire with thousands of mini-crystals.

Two years of testing have confirmed its firefighting performance and the suitability of its chemical and physical properties.

ICI has built a pilot plant with a capacity of several hundred tons a year, easily extendable. The Company is in touch with fire protection equipment manufacturers and fire authorities in the UK, the USA, and on the Continent.

'Monnex' in action at the Board of Trade's fire training school, Essex

Apollo, the moon, and chemistry

Once Apollo 11 was safely down, ICI Magazine asked David Jones, of the Company's Petrochemical and Polymer Laboratory, who often writes about science for the press, to give us his reactions. He writes:

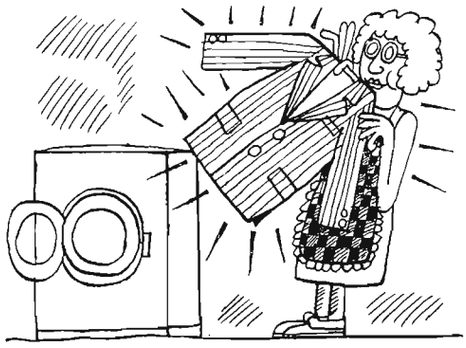
So man has reached the moon. Our practical arts have been stretched to their limits to achieve this first tentative landfall in the immense ocean of space; communications, materials science, environmental physiology, computing and navigation, all have developed enormously in the specialised dimension of space-technology. Chemistry has played a crucial role, producing new insulants, lubricants, elastomers and structural materials with the novel combinations of properties demanded by the harsh environment of space.

But its major achievements, the fuels that lifted and powered the colossal Apollo 11 rocket, are basically quite simple. The rocket motors of the first stage are chemical reactors taken to the limits of throughput and mixing and heat-exchange: in operation, 15 tons of fuel are pumped into them, mixed, reacted and discharged *every second*. But that fuel is paraffin and oxygen – which burn more sedately in your oil-fired central heating boiler!

Even simpler is the fuel of the second and third-stage motors, which accelerate the astronauts into earth-orbit and then into the long uphill climb to the moon. They burn hydrogen in oxygen: two of the coldest liquids known, producing the hottest and most energetic gas – water vapour. The command module was sent on its way under the old-fashioned – but still unsurpassed – energy of steam!

Can industrial chemistry expect any return from its part in the most dramatic journey of our time? The moon is a unique laboratory in which substances still guessed-at have been exposed for ages to physical conditions unknown on earth. But it will be a long time before it yields anything but precious new knowledge.

Even if there are diamonds there (and there may be), chemical-rocket travel is far too expensive to exploit them. We must wait for physics (nuclear, or perhaps the anti-gravity travel envisaged by science-fiction) to take over from chemistry, before moon-material finds its way into the terrestrial reactors of ICI.



Everyday life – with ICI

It's a far cry from fertilizers to the sails which helped take Sir Francis Chichester single-handed round the world in Gipsy Moth; or from girl models in glamorous fashion to a 'Ufoam' tanker to fill up the cavity walls of your house to keep it warm in winter.

Yet this was the kind of contrast built into ICI's exhibition at Teesside Agricultural Show to illustrate the wide-ranging nature of Company products that have established an indispensable place in everyday life.

'ICI in Everyday Life' was the title given to the display on the largest trade stand seen at a one-day agricultural show in the North of England. It ranged over finished products made from ICI materials with emphasis on those that have their beginning in the Company's Teesside factories.

A special feature was a parade of five girl models and two male models from London displaying fashion in 'Bri-Nylon', 'Terylene' and 'Crimplene' in a 100 ft × 40 ft air tent, itself made from 'Bri-Nylon'.

A sailing boat and the 108 square-foot 'Terylene' storm jib with which Sir Francis Chichester rounded Cape Horn in Gipsy Moth highlighted products for outdoor activities, set out with many other products in a big 100 ft × 50 ft marquee. Standing guard at the entrance was a carbon dioxide tanker such as is used to transport the gas in liquid form to the Central Electricity Generating Board's atomic energy power stations as a heat-transfer medium.

For the home, simulations of the kitchen, the bedroom and the bathroom showed a wide-range of everyday articles – furnishings, a Perspex bath, even a plastic ball valve for the cistern, squeeze bottles seen on every kitchen shelf and many other utility articles that bring ICI into the home. Paints and wallpaper made for decorative panels; a greenhouse with 'lights' in Novolux would have graced any garden alongside long-lasting utensils for the gardener.

ICI's large stake in materials for the car industry were featured with British Leyland's new Maxi car – Ambla upholstery, seat belts in 'Terylene' with fasteners in ICI plastic, light clusters in Diakon, and car finishes.

Rarely has such a collection of ICI products and materials been gathered under one roof. Never had Teessiders had such an opportunity of seeing so many end-products made from materials manufactured in the Company's complex of plants at Billingham and Wilton.

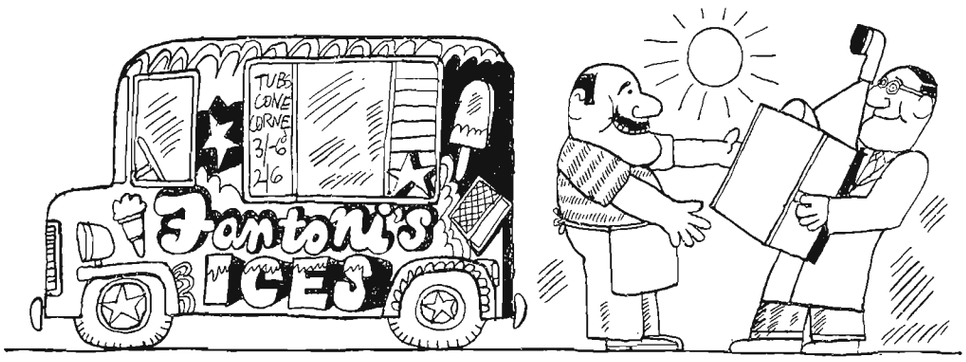
'Crimplene' for Men – in Europe

Garments in 'Crimplene' for Men from a dozen European countries will be shown by ICI at the International Men's Fashion Week at Cologne from August 22–24. About 50 garments will be shown in the ICI 'Fabricfocus' colours for Spring 1970 – brick, chalk blue, serpentin, granite and sand. There will also be several hundred fabrics. The display is a joint one by ICI Fibres (who market the Company's fibres in the UK and in Continental EFTA countries) and ICI (Europa) Fibres, (who look after Germany and the other EEC countries).

'Crimplene' for Men has created wide interest throughout Europe since it offers a major advance in comfort – plus virtual immunity to crumpling and creasing together with complete machine washability. All garments must meet the Company's stringent requirements, both in fabric and in making-up.

At present, most garments in 'Crimplene' for Men are made from double jersey fabrics which 'give' under stress but recover at once. Clothes are more comfortable to wear, because the jackets do not 'pull' across the shoulders or under the arms and trousers do not feel tight.

'Terylene' for giant tent: one of the biggest marquees ever made in the UK, possibly the world, covers 400 square yards, can take 9000 people. 'Terylene' Core Spun yarn, used for the first time in this tent produced by John P. Davies and Sons Ltd of Chester for the Llangollen International Eisteddfod, Wales, is stronger, tougher, more durable than most other materials. It needed 40 per cent less supporting weight – well over a ton



'Drikold' cools vans

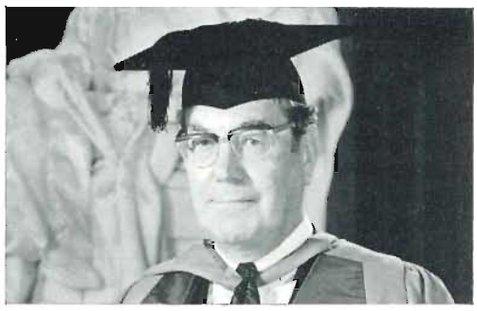
The 'Drikold' Van Cooler, a cheap (£60) thermostatically-controlled refrigeration system for retail delivery vans carrying perishable goods – is now being marketed by ICI Agricultural Division.

The VanCooler is designed to be operated with 'Drikold', ICI's solid carbon dioxide. Empty, the galvanised steel unit weighs 62 lb, is 4 ft 6 in high and 1 ft 9 in deep. When fully loaded with 120 lb of crushed 'Drikold', its maximum cooling capacity is 32,000 British thermal units. It is specially suitable for use in vans operating at temperatures of 35–50 degrees Fahrenheit, where refrigeration is wanted only in the summer, and where a large capital outlay is not justified. The unit comes out casily for cleaning or when not required in winter.

The VanCooler is normally placed inside the van at the front of the insulated compartment, against the bulkhead. The thermostatically-controlled fan passes air through a bed of crushed 'Drikold,' where it is cooled, then circulated inside the van.

The doors of such vans may be opened as many as 60 times a day, allowing cool air to escape and warm air to get in from outside. But the VanCooler counteracts this rise in temperature at once by operating as soon as the doors are closed to bring the temperature down to the level set by the customer on the thermostat, which then cuts out the fan.

'Drikold' VanCooler for retail vans, can hold 120 lb of Drikold, occupies 2·7 square feet of floor space. Its height is 4 ft 6 in, and its maximum cooling capacity is 32,000 Btu



LI.D for Mr Bagnall

On July 19 Mr F. C. Bagnall, ICI commercial director, received the honorary degree of Doctor of Laws from the University of Wales in a ceremony at the City Hall, Cardiff. He has been associated with South Wales for 25 years – right back to the time in 1944 when his first task on joining British Nylon Spinners as managing director was to choose a site for their first post-war factory at Pontypool in the South Wales Development Area. This established a leading man-made fibre plant in a part of the country previously without any textile industry.

In January 1950 Mr Bagnall was awarded the CBE for his work as Chairman of the Wales Business Training Committee. Later he became President of the University College of South Wales and Monmouthshire and Chairman of the South-Western Regional Council for the then Federation of British Industries.

'In the twenty years that followed his appointment as managing director,' runs the citation, [other extracts from which follow] 'Colin Bagnall developed a relatively small concern into a multi-million international project . . . such success of course had a tremendous vitalising effect on high-level industry in Wales; its momentum remains. Among a wide range of public service activities in Wales and elsewhere . . . Colin Bagnall has been associated with University College, Cardiff, for many years: as Governor, Member of Council, and, finally, President . . . It was he who inspired a model example of how industry should support scholarship when he persuaded British Nylon Spinners to endow three postgraduate studentships in . . . Chemistry and Physics at University College.' He is, 'a man who has sustained a wide and effective interest in university education and provided . . . a spendid example of industrial leadership in Wales.'

He explains gas-liquid chromatography

'You can't assume that if your student selects the wrong answer that he's an idiot. You can only assume that you have not explained it properly . . . and as far as possible, too, I like to avoid the pattern of YES – NO – NOT SURE answers. That's too automatic – and too much of a gamble. I want the student to apply his mind to the problems, not just to guess.'

Ever since his schooldays Jim Pattison, 37, a research scientist in the Company's Petrochemical and Polymer Laboratory at Runcorn, has always enjoyed teaching, explaining problems, communicating knowledge and showing how it can be applied. Back in the early 60's with HOC Division, on whose research department's safety committee he served, he helped to produce a safety handbook and an associated film strip. It was through introducing this film strip to students on industrial safety training courses that he became interested in educational methods, especially programmed learning.

Now, eight years later, he has come up with a new programmed-learning approach to gas-liquid chromatography, broadly defined as an analytical technique which separates the components of a reaction mixture and readily allows them to be identified. With this approach, he takes his intended readers, mainly O and A level grammar school pupils and National Certificate students in technical colleges, step by step through the theory and practice of the subject. Every stage he outlines has been verified by many different educational and industrial practitioners of the method.

His book, *A Programmed Introduction to Gas-liquid Chromatography*, fills 303 pages, costs 45s, and is published by Heyden & Son Ltd. Based on close personal knowledge and experience, it took several years to grow in his own mind, and about ten high-pressure months to write in his own time.

'When I joined the P & P Lab. in 1963,' he explains, 'I didn't know much about gas-liquid chromatography, because I had not had much to do with it then. When it was decided to equip the labs with this apparatus, I found that quite a lot of the other new people didn't know what it was all about. There were two standard textbooks available, but they were rather complicated for beginners. Soon after taking a

one-day course in the subject at the labs I began to feel something more was needed to help the new lab. assistants. When a course in programmed learning came up, organised by Birkenhead Technical College, and led by John Hebenten (Training Superintendent BP (Chemicals) Grangemouth, Scotland), I got permission to attend. I wanted to find out if programmed learning could help to explain gas-liquid chromatography to these new people.'

After the management, in particular Dr E. S. Stern and later Dr G. A. Gamlen, had seen the results of the programming exercise written as a follow-up to the course, they encouraged Jim Pattison to attempt a full programme on g.l.c. This led to his first major venture as an author. By the time he finished his book, he admits, he knew a great deal more about gas-liquid chromatography than when he started.

Jim Pattison, aged 37, was educated at A. J. Dawson Grammar School, Wingate, Co. Durham, and Sheffield University. He came into ICI at Billingham in 1957, where he worked on exploratory organic chemistry in the research department. He is married with three children and in his spare time is the organising secretary of the Moore Music Circle, a group which meets monthly for musical appreciation, a local preacher in the Methodist Church, and a parish councillor

'Ufoam' makes progress

The ICI Insulation Service, part of the Building Development Group, is marketing 'Ufoam', a product which prevents loss of heat through cavity walls, with notable success. Since the pilot project stage in 1967 there have been major expansions in mid-1968 and early 1969.

Most modern houses have cavity walls which offer some insulation by incorporating a 2½-inch air gap between the inner and outer 'leaves' of brick. 'Ufoam', by reducing air movement in the gap almost completely, cuts heat loss by up to 78 per cent if the cavity wall is brick/brick construction. Even with a thermal block inner leaf 'Ufoam' still gives savings of 64 per cent.

Since up to 30 per cent of 'paid-for' house heat is lost through cavity walls, one of the main advantages of using 'Ufoam' is that annual fuel bills can be reduced by up to 25 per cent.

'Ufoam' turns the inner house wall into a simple yet vast storage heater. It eliminates cold discomfort at room corners; diffuses warmth in the hall and on landings, and reduces condensation on walls.

'Ufoam' is specially formulated from urea formaldehyde resin. It resists mould and rotting, has no chemical effect on wood, plaster, brick or wall tiles, and is classed as self-extinguishing. It has been fully tested in theory and practice and it is known that water will not flow through it. When it sets a carefully-controlled shrinkage prevents the foam coming into direct contact with a soaking outer leaf.

Anyone interested in this new insulation should write to P.O. Box 100, Welwyn Garden City, asking for a representative to call. Costs are about 1s to 1s 6d a sq. ft, i.e. about £60–£70 for a large semi-detached house or £70–£80 for a medium-sized detached house. The treatment is completed in one day between breakfast and tea. If the work is done while the house is under construction, there is a saving of 20 per cent.

Terms are available and, since insulation with this product is classed as a home improvement by the Government, tax relief is available on any interest paid. The Insulation Service is 100 per cent ICI and operational teams are qualified ICI staff from three major depots at Welwyn, Newbury, or Burton-on-Trent.

More 'Flexel' contracts

During the first quarter of 1969 the 'Flexel' group of Nobel Division obtained contracts from several local authorities for the installation of 'Flexel' ceiling heating in about a thousand houses, the largest contract being from Gateshead Corporation for 458 houses. Negotiations are now in hand with the Corporations of Liverpool, Manchester and Stockton.

Announcing this news recently, Mr George Bell-Barker, manager of the 'Flexel' group, said that 'Flexel' was rapidly expanding its impact on the space-heating market throughout the UK. Most Scottish local authorities were now using it and many repeat orders had been placed. In Ireland, where 'Flexel' had been introduced only about a year ago, there were already installations at Larne, Limavady and Lurgan and several contracts had been awarded.

'Flexel' electrical ceiling heating, invented, developed and produced by ICI Nobel Division at Ardeer, Ayrshire, is based on a conducting silicone polymer coated on glass cloth. It is fixed to ceiling joists and converts the entire ceiling into a radiant heat panel.

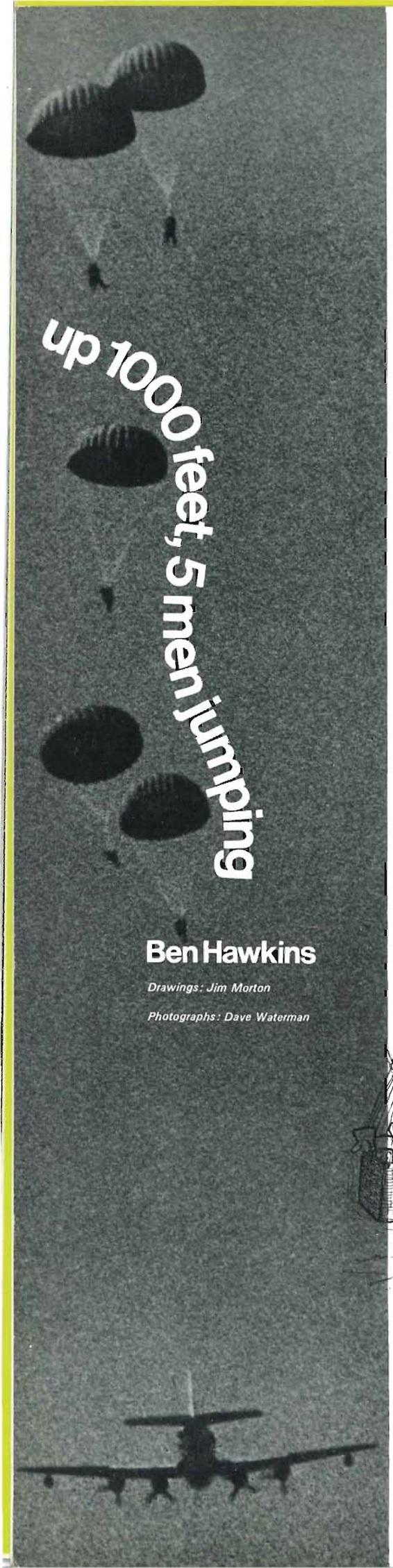
New sterilising gas

'Sterethox,' non-flammable gas marketed by ICI Mond Division, penetrates and sterilises many packaging films and plastics and is used by the medical profession to sterilise pre-packed disposable equipment (such as plastic hypodermic syringes) and surgical apparatus sensitive to heat. Certain pharmaceutical preparations and dressings, as well as some veterinary equipment, can also be sterilised by treatment with 'Sterethox'.

It is non-corrosive as well as non-flammable, and its great advantage is that it sterilises at low temperatures, from room temperature to 60–70°C.

US acclaims ICI drugs

Two heart drugs discovered by Pharmaceuticals Division, 'Atromid'-S and 'Inderal', have been named among the fifteen outstanding prescription products marketed in the US from 1959 *to* 1968. *They were cited in a poll of* 170 *experts from* 64 *leading medical schools, hospitals and research centres in that country, carried out by* The Medical Letter, *a publication which evaluates prescription drugs for the American medical profession. Both products are used to treat certain heart and circulatory conditions.*



up 1000 feet, 5 men jumping

Ben Hawkins

Drawings: Jim Morton

Photographs: Dave Waterman

It is human nature at times to question one's own sanity. In my case such a moment came when I found myself 500 feet above the ground, suspended in a basket beneath an old barrage balloon. I was about to make my first parachute jump.

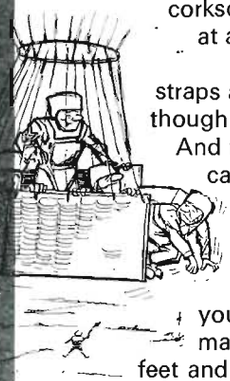
It's normal practice to do a first parachute jump from a balloon and this makes it psychologically worse for two reasons. Firstly, the obvious one that it *is* the first time. Secondly, that it is so quiet. At least with an aeroplane there is noise, wind, shouting and numbers. But with a balloon it is different. Just a muted hum from the rigging lines and the distant sound of a shunting engine miles away. There is nothing to distract the mind. Just five nervous 'first-timers' and one sadistic Army parachute jump instructor.

'Anyone know a good dirty joke?' asks the APJI. I hardly know where my Adam's apple is, let alone dirty jokes. Just before the balloon left the ground the APJI had shouted 'Up 1000 feet, five men jumping'. I am still converting this hopefully to 'Up five feet, 1000 men jumping'.

Then we reach the top, 1000 feet of wire out, and there is a slight tug as the brake goes on the winch. Below lies Berkshire looking beautifully green and peaceful with Abingdon directly beneath us and the Thames winding lazily on and on into the distance. To the North lies Oxford where undergraduates are having tea, planning parties, dreaming of evenings at 'The Trout' with . . .

But not me. I am watching a little man the size of an ant, 1000 feet below. He is waving a red flag, but then he stops and picks up a blue one. The worst has happened: all is safe to jump. The wind has carried the balloon to a safe angle off the wire.

'Who's first?' the APJI asks. 'Ah! We have an officer among us. He will show us how it's done won't you, sir?' He beckons fairly kindly at me. 'By jove sir – we are tall aren't we? Heavy too, I imagine. Land with your legs twisted sir, and your arms out, and then they can unscrew you like a corkscrew.' How can a man joke at a time like this? 'Now, just one more check on your straps and buckles,' he grins. 'As though your life depended on it!'



And there I am in the door, the cage swinging slightly in the quiet air. A firm hand grips my shoulder strap. A voice behind me, not joking any more, says 'Remember all you've learnt, look up at the main chute after about 200 feet and if it's not open properly – pull your reserve. I am not going to push you, we never do that. Are you ready?

'Yes', I squeak.

'Stand by . . . Go . . .'

Wind, wind, faster, faster. My stomach is about three feet above my head. My clothes are flapping. Then there's a jerk. The drill comes back. I look up. My parachute is flying well. It looks huge, white and wonderful – my life suspended from a thirty-two foot circle of nylon.

What a view! I have little time to admire it, however, for the horizon is rising quickly and the ground moving faster and faster towards me. I am coming in for a 'side right' landing – or is it a 'back left'? Then all reason and wind is knocked out of me.

All is silent. Flat on my back I can see a small balloon in the sky. Green and white parachutes are drifting down from it. I can hear a bee near me still busy collecting honey, totally oblivious of the fourteen-stone creature that has just fallen rather ungracefully from the sky.

And then an electronic voice shouts 'Come on No. 1, that was the worst flight I've seen yet. Get up and fold your chute.' But as I do so I can only think: I've done it, I've really done it.

Of course there are endless stories about parachuting. There is the famous one of the corporal who wouldn't jump. When asked why, he pointed out of the aircraft and said 'There's a bloke out there' – and sure enough pinned to the fuselage was a parachutist caught by the rip-cords. The APJI who climbed out, freed him and pulled his chute open got a George Cross for that. Then once we jumped at night and the cook landed in a tree and screamed for help while hanging suspended upside down. He thought he was about 100 feet up, but when a torch was brought his head was only six inches from the ground! Another time we did a jump near the M6 with an erratic pilot. One man was lost and Land Rovers searched for him in an ever-widening circle. He was eventually found sitting on his parachute in the snack bar of a service area enjoying a free cup of tea. The lucky Scottish major whose parachute was ripped off by the slipstream and landed on somebody else's canopy is another famous incident. He looked through the stabilising hole and said 'Hi there!'

The private below, whose chute it was, fainted.

I finally got my wings after jumping into a particularly large cowpat in the middle of York racecourse during a demonstration. My Colonel said in a very far-back voice that it was 'a very accurate jump'. But jumping with a week's rations, a wireless set and a rifle, into Germany, Cyprus and Norway, although never less than exciting, was never quite the same as that first time from the barrage balloon hanging at 1000 feet over Berkshire.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